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ABSTRACT

Proposals are presented for policy development and planning for telecommunications courses in California community colleges, along with a paper which addresses the need for statewide telecommunications planning to serve the community colleges. After background material discusses the history of attempts at statewide planning for telecommunications in the colleges, the guidelines for educational telecommunications courses are presented. The guidelines cover the instructional delivery methods utilized; general requirements; course review and approval procedures; appointment and evaluation of faculty; course evaluation; student performance; and student services. The next section examines prospects for statewide planning for telecommunications courses in the California community colleges, focusing on the issues of liaison with other groups and segments; state planning in telecommunications; national efforts to use telecommunications technology to extend educational services to those unable to reach campuses; planning in California community colleges, including local efforts to develop courses utilizing new systems; the exploration of emerging technologies; and a summary of some of the questions that need to be answered in planning telecommunications for the state's community colleges. Appendices include a list of members of the Chancellor's Advisory Committee on Telecommunications and a telecommunications glossary. (HB)

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PROPOSED GUIDELINES FOR TELECOMMUNICATIONS COURSES

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Program Evaluation and Approval

Office of the Chancellor
California Community Colleges

JC 850 213

Board of Governors of the California Community Colleges
Sacramento, California
May 30-31, 1985
Agenda Item 6

Board of Governors of the
California Community Colleges
May 30-31, 1985

Item 6

Title: Proposed Guidelines for Telecommunications Courses

Staff Presentation: Allan Petersen, Administrator
Jim Nelson, Specialist
Program Evaluation and Approval

Summary

This item is presented to inform the Board of two policy development and planning proposals that have been developed by staff in conjunction with the Chancellor's Telecommunications Advisory Committee. A set of guidelines has been developed for community college telecommunications courses (Part I of this item) and a preliminary paper has been drafted which addresses the need for statewide telecommunications planning to serve California Community Colleges (Part II of this item). Members of the Chancellor's staff worked with the Committee in formulating these statements and both statements have been reviewed by the staff.

One of the major tasks assigned to the Chancellor's Advisory Committee on Telecommunications, which was established in 1982, was to develop statewide guidelines for telecommunications courses. The reason for the assignment was the continuing concern for the quality of some television courses offered by community colleges in California. As a result of this concern, both the University of California and the California State University began a review of the television courses offered at one of the community colleges. The matter of quality was also of concern to the Chancellor's Office, the statewide Academic Senate and other groups.

After a long period of study and negotiation, the proposed guidelines for Telecommunications being presented to the Board were developed.

The proposed guidelines represent an important step in ensuring that all courses offered by Telecommunications are subjected to the same development and review as all other courses which are offered by community colleges. This action is also in furtherance of the Board of Governors' Basic Agenda for 1985, which calls for efforts to improve academic quality of community college courses and programs.

The Educational Policy Committee review the should proposed guidelines for Educational Telecommunications Courses. Final Committee and full Board action are recommended for July.

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Background

In December 1952, in an address to the California Governor's Conference on Educational Television, Governor Earl Warren suggested that, "We are coming to grips with the richest opportunity in history to make available to every person all the cultural resources that have been painstakingly formed and assembled throughout the centuries."

During the nearly thirty years since that keynote statement, there have been many developments in television which have aided in the education of our society. Today, however, we have an even richer opportunity to utilize an expanded telecommunications technology to realize the 1952 vision of Governor Warren.

Since the advent of the microchip and the concomitant rapid advances it made possible in telecommunications technology, community colleges have made enormous strides in the use of telecommunications for instruction and support services. These developments have, up until now, been largely uncoordinated at the state level. Two factors particularly create a current need for statewide attention to telecommunications in community colleges.

One of these factors is the nature of the technology itself, which makes compatability of systems among the districts and campuses very important, and coordination of efforts among the segments of postsecondary education in California highly desirable for efficiency and maximum usefulness. The second is that deregulation statutes stipulate that cable operators must provide specific amounts of cable access for educational institutions. A statewide coordination effort is needed for community colleges to take maximum advantage of these provisions.

To address these and other concerns, a Chancellor's Advisory Committee on Telecommunications was established in January, 1982. (See Appendix A for membership.) The Committee was charged with the identification and clarification of policy issues concerning the use of telecommunications within the community colleges, assisting in the development and design of a statewide interconnection system, monitoring current legislation relating to telecommunications, suggesting needed legislation, planning for coordination with the other segments of postsecondary education and with private cable operators, and advising the Chancellor's Office and the Board of Governors on all matters concerning the use of telecommunications in the instructional program.

An early major effort of the committee was the preparation of a presentation to the Board of Governors in January 1982 which identified policy issues, which the Board might be asked to consider and which demonstrated some of the current uses of telecommunications in California community colleges.

Until this year the Chancellor's Advisory Committee has been coordinated by a Specialist from the Program Evaluation and Approval Unit. Recently, a part-time Telecommunications Coordinator has been engaged for a portion of the 1984-85 academic year with funds obtained through a grant under the Fund for the Improvement of Instruction. The major tasks of the Coordinator are to develop a method for the establishment of a master plan for telecommunication for the community colleges, to act as a consultant to the Advisory Committee,

and to review current legislation and suggest needed legislation. Because of the need for statewide coordination of telecommunications for the community colleges, it is hoped that the services of the Coordinator can be continued in the future. The other two segments of higher education are devoting major resources to such coordinating efforts.

Because of a continuing concern about the quality of television courses, the Statewide Academic Senate, the State of Texas, the Commission on Instruction of the California Association of Community Colleges, and the Bay Area Television Consortium individually developed guidelines for such educational offerings. The Advisory Committee studied all of those guidelines and developed the guidelines for California Community Colleges which are being recommended by staff in Part I of this agenda item. After an extended period of discussion and compromise, the guidelines for all telecommunications courses were supported unanimously by the members of the Advisory Committee.

If statewide coordination and planning for telecommunications in the community colleges is to be initiated, a necessary first step is the completion of a comprehensive inventory of telecommunications equipment and facilities presently located in the field. Accordingly, the Advisory Committee has undertaken such a comprehensive inventory. This first effort should be invaluable in determining next steps in planning for the statewide coordination of telecommunications in the community colleges. The full report of the survey will be made available to the Board at a future meeting.

Concurrent with the completion of the Survey of Operational Applications of Telecommunications, the Advisory Committee is also preparing a recommendation concerning the Masterplanning of Statewide Telecommunications. It is anticipated that the recommendation will be presented to the Board as an information item at a later time. In the meantime, a preliminary draft of an information paper entitled "Statewide Planning for Telecommunications: Prospects for California Community Colleges" has been prepared and is presented to the Board as Part II.

As another essential step in the planning for statewide coordination of telecommunications, the Advisory Committee, with the assistance of the Telecommunications Coordinator, is planning two statewide telecommunications conferences to be held in the fall of 1985 and the spring of 1986. The major purposes of those conferences will be to introduce community college administrators and faculty to state of the art equipment and to explain and discuss the need for, and the advantages and potential of statewide coordination of telecommunications for California's community colleges.

In the American Community College Cohen and Brower stated that one of the important tasks for community colleges was to make use of the rapidly developing technological aids to instruction. The work of the Chancellor's Advisory Committee on Telecommunications will support our community colleges in performing that task in the future and to provide additional educational opportunities to many students.

Staff recommends that the Education Policy Committee review the proposed guidelines for Educational Telecommunications courses. Final committee action and full Board action is recommended for July.

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Part I

GUIDELINES FOR EDUCATIONAL TELECOMMUNICATIONS COURSES

INTRODUCTION

Educational telecommunications is understood to embrace the application of electronic media to the development and delivery of instruction as well as administrative and student support services. Educational telecommunications courses are those whose primary means of instructional delivery utilize such techniques as:

open broadcast, cable, and low power television;
instructional television fixed service;
direct broadcast satellite;
radio;
computers and data communications;
electronic mail and office automation;
interactive video and data systems;
videotext and teletext;
audio and video teleconferencing; and
integrated broad band communications.

The following guidelines are recommended for course review and approval, appointment and evaluation of faculty, course evaluation, student performance and evaluation, and student services as they apply to educational telecommunications courses.

GENERAL REQUIREMENTS

Educational telecommunications courses approved for independent study are subject to the legal requirements that apply to courses taught in this mode. All courses, regardless of instructional mode, should operate within the same organizational and academic structures. Educational-telecommunications courses must meet the same quality standards required in on-campus traditional curriculum offerings and operate within the same organizational and academic structures.

COURSE REVIEW AND APPROVAL PROCEDURES

Educational telecommunications courses are subject to the same approval process that governs all curriculum development at a college or in a district, including subject matter, faculty review, and evaluation of the proposed courses in accordance with established procedures. Consistent with the review process to which all courses are subject, regardless of the mode of instruction, approval of educational telecommunications courses includes consideration of the following:

a. course objectives;

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b. level of instruction represented by the content of the course, required reading, activities, assignments, and examinations;

c. the need, if any, for the development of supplemental and/or enrichment materials and activities;

d. course outline providing for student learning objectives by requiring learners to analyze, synthesize, perform critical thinking, and express ideas in an articulate manner;

e. a clearly stated rationale for awarding academic credit which addresses anticipated student workload;

f. appropriate location within the college curriculum;

g. early and regular instructor contact with students by utilizing personal conferences, telephone contact or correspondence, on-site orientation, study sessions, supplemental seminars, labs, field trips, and library workshops.

APPOINTMENT AND EVALUATION OF FACULTY

Instructors assigned to courses taught in an educational telecommunications mode should be selected by procedures consistent with those used to determine all instructional assignments. They should be selected on the basis of expertise in the subject matter in order to assure that academic rigor is comparable to similar courses taught in the traditional mode. Faculty assignments should consider the preferences of faculty regarding participation in telecommunications classes. Compensation and evaluation of faculty should be consistent with equivalent instruction in the college, regardless of teaching modes.

COURSE EVALUATION

Educational telecommunications courses should be regularly and systematically reviewed and evaluated in ways similar to those employed for other courses offered for credit.

STUDENT PERFORMANCE

A student who wishes to enroll in a course taught in an educational telecommunications mode should satisfy the same requirements for admission to the institution, to the program of which the course is a part, and to the course itself, as would be expected of a student enrolling in the same course taught in the traditional on-campus mode. Each such course should include procedures for monitoring and assessing student performance, provide for timely feedback to students regarding their progress and performance, and make provision for sufficient interaction between the student and the faculty member teaching the course. Interaction between the students and the faculty member needs to be made available in the form of group sessions and individual consultation. The

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frequency and integrity of the student assessment methods and grading practices should be equal to that required in the equivalent traditional course.

STUDENT SERVICES

Regardless of the instructional mode, all students should have equal status and access to support services available within the institution.

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Part II

Statewide Planning for Telecommunications: Prospects for California Community Colleges

Introduction

This section examines briefly several of the most significant influences and conditions having importance for statewide planning of telecommunications to serve California Community Colleges. A similar effort was undertaken previously by the Chancellor's Advisory Committee on Telecommunications. (See Board of Governors Agenda for January 1982, item 11; and "Telecommunications: Applications and Prospects for the California Community Colleges," Chancellor's Advisory Committee on Telecommunications, October 1982.) This is intended to update the earlier paper and represents an initial draft.

Background

For the past three years, the Chancellor's Advisory Committee on Telecommunications has worked with staff on several major tasks. First, an effort has been made to monitor the rapidly changing evolution of new and emerging technologies. Second, steps have been taken to strengthen communication and liaison between community colleges and other segments of postsecondary education. And third, a statewide survey has been conducted and statewide conferences planned to determine the present status of telecommunication utilization in community colleges and identify major currents of interest for future development.

Issues

Liaison with other groups

Both the University of California and the California State University systems appear to have given high priority to telecommunications planning and activity. Both systems have committed staff time and money to development of Master Plans and subsequently provided resources for implementation of those plans. The stated goal is to develop system-wide support that will make their respective University systems more flexible, cost effective and accessible.

The University of California has developed a master plan that uses microwave and telephone technology which will, when completed, provide data and voice services between all campuses and the system-wide offices. The system will also be capable of transmitting video signals in the future.

The University of California Assistant Vice President of Information Services has let a request for proposals to begin construction of the first phases of the system. Funding has been earmarked and an increase in data service planned as a result of the new capability.

The Systemwide Office of Information Services at the California State University has also developed a master plan for their campuses. That system utilizes microwave and telephone transmission capability to provide certain administrative services. The Systemwide Continuing Education Office has developed

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a master plan utilizing both ITFS (Instructional Television Fixed Service) and microwave to provide instructional capability to distant learners. A recent RFP indicates an intent to merge the concept of those two plans to serve the University system. Much of the ITFS and Microwave "Backbone" system is already in place. That system runs from Chico in the north to Sacramento, then picks up at Stanislaus State extending down to Merced and Fresno. It picks up again in the Los Angeles basin and is currently almost to San Diego, where the system is moving up to join the northern links.

State Planning

Two years ago a project supported by the Public Broadcasting Commission surveyed telecommunications activity in California's public sector. That study, called the Public Telecommunications Project, was developed by the Center for Communications at San Diego State University. Its conclusions culminated in last year's SB 1395, known as the CalCom Bill. Hearings were held for the bill throughout the State to analyze and critique findings of the study and activities suggested by SB 1395. The study identified one billion dollars of tax monies being spent each year in telephone and data services for California's public sector at pre-divestiture levels. As a result, the CalCom Bill proposed that a publicly-owned telecommunications system be built with a loan from the State, which could become self-sustaining within three years, providing expanded services at reduced cost to participants. During this interval, AT&T went through divestiture and, with a variety of objections from private sector lobbying, the bill went down to defeat the last day of the legislative session.

Last spring the State Office of Information Technology, Department of General Services, and the Office of Information Services issued what was commonly referred to as the "State Strategy on Telecommunications." That position paper proposed a new Office of Telecommunications at the State level which would deal with the increasing issues surrounding new and emerging technologies. When CalCom was defeated, the "State Strategy" went with it because the budget and concept set forward by the State had been joined to SB 1395 at the last minute.

This spring, bills by Senator Alquist and Assemblywoman Moore have reintroduced concepts that would place Telecommunications Planning at a high priority for state governments. These bills are yet to be acted upon.

On April 22, 1985, the Commission on State Government Organization and Economy, more commonly referred to as the Little Hoover Commission, issued a lengthy report on Telecommunications in State Government. It estimated that California probably will spend approximately $250 million this year in telecommunications. The report indicates that proper planning can probably reduce that amount by at least $50 million. Response to the study is still to be determined, but the implication of the report is clear. Telecommunications planning should be a high priority for public agencies and cannot be ignored because of budget savings. Greater flexibility, quicker communication, more sophisticated data development and expanded access to resources are other potential benefits of such planning.

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National Planning

Activity at the federal level is also increasing. In February, S. 480 was introduced by Senators Hatch, Hawkins and Dodd. The bill, entitled "Postsecondary Continuing Education Innovation and Outreach Grants," speaks specifically to using telecommunications technology to extend educational services to those unable to reach campuses. The bill proposes to support demonstrations of telecommunications technology used to distribute instruction to those denied campus access.

The American Association of Community and Junior Colleges, (AACJC), in its Public Policy Agenda, has just adopted a new goal. That goal is entitled "Introducing Information-Age Technology Into Colleges." It speaks to community colleges' utilizing telecommunications technologies to keep up with business and industry in the area of equipment and use of that equipment more effectively in instruction, student services and administration. The policy statement addresses goals to be reached in helping community colleges across the nation come into the "Information Age."

Many states have addressed the issue of telecommunications use by forming consortia and/or associations in order to share resources and be more cost effective. Others have developed systems that serve regional or district needs. New Jersey, Oregon and some other states have moved toward state activity, while Texas, Illinois, Florida, Arizona and Michigan represent examples of regional and district activity. All are deeply involved in developing and exploring new and emerging technologies and evolving plans that utilize options now available to provide better and more flexible services.

California's Community College Planning

In California, there is little statewide planning going on which is directed toward community college needs. To date, California's community college system has not been included in any of the telecommunications master planning conducted in the state.

However, several districts have taken action as independent units. Yosemite designed a master plan which has enabled it to grow with the changing technology options. That district, utilizing its own coaxial cable between campuses and a closed voice and data system to its third campus sixty miles away, demonstrates what can be done. Southwestern has identified the uses of technology and has forged ahead, as has DeAnza, Santa Ana and San Diego. These districts, however, generally work independently of each other and other districts within the state. As a result, several "systems" could be functioning in California which lack the ability to interconnect and share resources.

Exploration of Emerging Technologies

There are numerous telecommunication options available to colleges today (glossary attached). Many colleges have already begun their own individual explorations of the "Information Age." Maricopa in Arizona, for example, is

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using Television, Radio, Telephone, Video Text, Slow Scan TV and Computers to deliver distant instruction and increase information distribution within their campuses.

The following options appear to warrant serious exploration by California colleges to determine their potential usefulness and feasibility:

Cable/Institutional networking and two-way video
Television - open circuit
VideoText
TeleTex
Radio
Computers/personal and mini for student, staff and community use
SCA (FM frequency distribution)
Digital distribution of video (when cost effective)
Video Disk
VHS Cassette
Satellite

The State in its "strategy" focuses on departments and divisions currently being served, but appears to ignore the community colleges and the K-12 system, which are not users of existing State systems; nor are they included as prospective users of planned systems. It appears that the other postsecondary segments have determined it is in their best interest to develop their own plans that do not depend upon shared networking or linkage with other segments. Community colleges must face up to the same basic question, i.e., whether to depend upon the telecommunications planning of others which presently does not provide for community colleges, or initiate planning which does respond to community college needs.

Summary

Among the questions which need to be answered in planning telecommunications for California Community Colleges are the following:

1. In what ways can new and emerging technologies help colleges be more flexible in the delivery of services? Are those activities cost effective?

2. How can colleges work and effect linkages so that resources might be more effectively distributed?

3. What are the implications in curriculum development, student services, instruction, library activity and administration basic to master planning the use of telecommunications?

4. Are there ways that community colleges can link with other segments in order to be more cost effective in utilization of telecommunications?

5. What does the use of technology in distributing services imply relative to staffing formulas?

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6. How has the divestiture of AT&T affected information systems used by the community colleges in the State?

7. Is legislation needed to provide the necessary tools for community colleges wishing to use new and emerging technology?

8. What support and resources for telecommunications are needed at the level of the Chancellor's Office? How can this be attained?

The Committee and staff have formulated and embarked upon implementation of a process to answer the foregoing questions and develop a policy recommendation to the Board of Governors regarding statewide telecommunications planning. The steps of the process are as follows:

1. Develop a telecommunications information distribution/exchange system (a newsletter will soon be initiated as a first step).

2. Determine current status and needs of telecommunications capability within California community colleges (a survey has recently been conducted).

3. Determine the nature of telecommunications planning and activity in other segments of California postsecondary education and its implications for community colleges. Consider telecommunications planning of community colleges in other parts of the country.

4. Conduct statewide conferences on telecommunications for community leaders and users.

5. Develop a recommendation on telecommunications masterplanning for California Community Colleges.

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APPENDIX A

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TELECOMMUNICATIONS GLOSSARY

ACCESS CHANNELS--Channels set aside by the cable operator (or specified by ordinance) for use by the public, educational institutions, municipal government, designated institutions, or for lease on a non-discriminatory basis.

ALPHANUMERIC KEYBOARD--A keyboard which allows communications with a computer in letters and numbers. Text displays consist of alphanumeric characters.

AM (Amplitude Modulation)--One of several ways of modifying a radio wave to carry information; also the radio band allocated to AM radio services. (See FM.)

ANALOG--A method of transmission such that the information is represented by continuous wave forms that vary as the source varies. (See digital.)

BANDWIDTH--The difference, in hertz (cycles per second), between the highest and lowest frequencies needed for adequate transmission of a given signal. Bandwidth is also a measure of the rate at which digital information can be carried by the transmission circuit. Current technology now has an upper limit of about 4 bits-per-second (bps) per 1 Hz, depending on the modulation technique.

bps--Bits per second

BROADBAND--1. A general term used to describe wide bandwidth equipment or systems which can carry a large portion of electromagnetic spectrum. A modern broadband communications system can accommodate all broadcast and many other services, with its 400 MHz capacity. 2. A range of frequencies wider than that required for just voice communications. Broadband channels are used predominantly for delivery of video material and for high-speed data transmission. (See narrowband.)

BROADCASTING--Transmission intended for reception by the general public.

CABLE TELEVISION--A communication system that distributes broadcast television signals, satellite signals, original programming, and other signals by means of coaxial cable. Also known as Cable Communications, or Community Antenna Television (CATV).

CARRIER--A signal of known characteristics (usually frequency) that is altered (modulated) to carry information. Changes in the expected form of the carrier by the receiving unit are interpreted as information. (See also subcarrier, comon carrier.)

CHANNEL--In television, a single path or section of the electromagnetic spectrum 6 MHz wide, which carries a television signal, used for the transmission of associated video and audio signals. Generally, a data path which is referred to without regard to the physical connections.

CHANNEL CAPACITY--The maximum number of channels that a cable system, or some other delivery system, can carry simultaneously.

CHIP--The heart of a microcomputer, a piece of silicon smaller than one's fingernail on which thousands of electronic elements are implanted. Called a microprocessor, it contains all the circuits one needs to carry out the many computer operations.

CIRCUIT SWITCHING--Physical interconnection between two circuits or channels. The term is in contrast with message switching.

COAXIAL CABLE--A copper or copper-sheathed aluminum wire surrounded by an insulating layer of polyethylene foam, used to carry the TV signals through the CATV system using current technology.

COMMON CARRIER--An entity that provides communication services to the public, at set rates, on a non-discriminatory basis, and exercises no control over the message content. Common carriers are regulated by state and/or federal agencies.

COPYRIGHT--exclusive right of ownership, distribution or presentation of a literary, theatrical, musical, or artistic work.

DBS (Direct Broadcast Satellite)--A proposed system in which signals would be transmitted directly to a receiving dish on a subscriber's home, via satellite, rather than over cable or an intermediary terrestrial broadcasting station.

DEDICATED LINES--Telephone lines which are leased for a specific term, between specific points, usually offering broader-band service than regular phone service.

DIGITAL--A method of transmission such that the signal consists of an off/on pattern representing bits of information.

DOWNLINK--A receiving antenna designed to pick up signals from a communications satellite. (See uplink.)

DOWNSTREAM--Direction of cable signal from the headend to the subscribers.

EARTH STATION--Facilities to transmit, receive, and process microwave communication via satellite, utilizing round antennas called "dishes."

EDUCATIONAL CHANNEL--A channel or channels set aside for educational uses. Sometimes the uses are local school programs outside of course work. Some cable systems offer equipment to local schools for their use to cablecast school classes. This can be offered on the elementary, high school, and college levels.

ELECTRONIC MAIL--The delivery of correspondence, sometimes including graphics, by electronic means, usually involving the interconnection of word processing, facsimile, and computer equipment. Reception can be by electronic video display of text or by printout. (See facsimile, word processing.)

FACSIMILE--Transmission of images of original documents (including both print and graphics) by electronic means--usually via the telephone network. (See electronic mail, word processing.)

FCC (Federal Communications Commission)--A federal agency established in 1934 with broad regulatory power over electronic media, including radio, television, and cable television.

FIBER OPTICS--The very latest in cable technology and in other communication uses. A very thin glass fiber which has the ability of transmitting light signals which can be modulated to carry many forms of information such as data or television signals. Structurally, the fiber consists of two types of glass (each with slightly different optical properties), with one type surrounding the other.

FM (Frequency Modulation)--One of several ways of modifying a radio wave to carry information; also a radio band allocated to FM radio services. (See AM.)

FRANCHISE--The contractual agreement between a cable operator and a governmental body which defines the rights and responsibilities of each in the construction and operation of a cable system within a specified geographical area.

FRANCHISING AUTHORITY--The governmental body responsible for specifying the terms of a franchise, awarding it, and regulating its operation. While the Franchising Authority is

usually a local city or county body, some areas are regulated exclusively on the state level.

FREQUENCY--The number of periodic waves (such as in radio or television) in a given amount of time, expressed in Hertz (or cycles per second). Different frequencies define the channels of radio or television signals.

GEOSYNCHRONOUS ORBIT--An orbit 22,300 miles above the equator, in which a satellite appears to remain stationary in the sky because it is moving at precisely the speed of the Earth's rotation.

GIGAHERTZ (GHz)--A unit of frequency. One GHz equals one billion cycles per second.

HARDWARE--1. The electronic equipment (computers, terminals, telephones, switchboards, etc.) of telecommunications and/or data processing systems. (See software.) 2. Mechanical, magnetic, electrical, and electronic devices which make up a computer. 3. The equipment used in production. storage, distribution, or reception of electronic signals.

HEADEND--The electronic control center generally located at the antenna of a site of the cable TV system where incoming signals are amplified, filtered, or converted as necessary.

HERTZ (Hz)--A unit of measure denoting one cycle per second. Radio frequency signals are usually measured in terms of kilohertz (1000 cycles per second) or megahertz (one million cycles per second).

INTELSAT (International Telecommunications Satellite Organization)--Worldwide association of nations to operate Earth's major international communications satellite system.

INTERACTIVE--1. System capable of two-way communication with a user during operation. 2. Descriptive of a telecommunications system whose response time to user input is nearly immediate.

INTERCONNECTION--A link between communication systems, often by terrestrial microwave or satellite.

ITFS (Instructional Television Fixed Service)--A band of 28 microwave video channels reserved for education and non-commercial use. Special antennas and down-converters are required and since such programming cannot be seen by the general public, it is a "fixed service" rather than broadcasting.

KILOHERTZ (KHz)--A unit of frequency. One KHz equals one thousand cycles per second.

LEASED CHANNELS--Channels that might be available for lease from the cable company. They can be leased by groups or individuals for the sole use of the lessee at posted rates. These may be in addition or in place of designated channels such as public, education, and government access channels.

LOW POWER TELEVISION STATION (LPTV)--A television broadcast station which is licensed to operate under Part 74 of the Rules and Regulations of the Federal Communications Commission (FCC) as a TV translator with waiver(s) to permit local origination; or is licensed to operate under such amendments, addenda, or additions to those rules and regulations as may result from procedures under FCC Docket 78-253. Limits on effective radiated power are 10 watts for VHF, 1000 watts for UHF.

MATV (Master Antenna Television System)--A system that serves a concentration of television sets such as an apartment building, hotel, etc., utilizing one central antenna to pick up broadcast signals.

MEGAHERTZ (MHz)--A unit of frequency. One MHz equals one million cycles per second.

MESSAGE SWITCHING--A computer based switching technique that transfers messages between points not directly connected. The switching facility receives messages, stores them in "queues" for each destination point, and retransmits them when a facility becomes available.

MICROPROCESSOR--A miniature-sized solid-state circuit containing memory and sequencing logic which is used to receive and respond to temporary and/or permanent instructions which are in turn used to control other pieces of equipment and their various functions.

MICROWAVE--Line-of-sight, point-to-point transmission of signals at extremely high frequencies.

MODEM--A device that enables computers to communicate with each other's own telephone lines.

MSO (Multiple System Operator)--A company that operates more than one cable television system. The nation's largest MSO currently serves more than 1.3 million subscribers.

MULTIPOINT DISTRIBUTION SERVICE (MDS)--Stations intended to provide one-way microwave radio transmission (usually in an omnidirectional pattern) of customer supplied programming from a stationary transmitter to multiple receiving facilities located at fixed points designated by the customer.

NARROWBAND--A range of frequencies not wide enough to include video signals; used primarily for voice signals. (See broadband.)

NARROWCASTING--A term that emphasizes transmission of specialized programming to relatively small groups, as compared to broadcasting which is intended for larger groups.

ON-LINE--Connection to a central computer, often remotely and involving the nearly instantaneous entering of information to a processor. (See teleprocessing.)

ORDINANCE-- In cable, the enabling legislation passed by local government to establish guidelines for the franchising process within a legally defined area.

PACKET-SWITCHING--A technique, usually digital, in which input information--voice or data--is broken into short "packets" allowing high-capacity, high-speed transmission which may then be delivered to selected users.

PUBLIC ACCESS--Access by the general public to speak or present program materials on cable television channel normally dedicated for this purpose.

PSSC (Public Service Satellite Consortium)--A non-profit organization having as members over one hundred institutions and organizations interested in the use of satellites and other telecommunications for public services.

SATCOM--the domestic communications satellites operated by RCA American Communications.

SATELLITE--In communication, a device, usually in geosynchronous orbit, which receives and relays audio, video, and data transmissions.

SOFTWARE--Programming and programming materials such as films, videotapes, and slides; or the instructions and storage media that determine the steps to be followed by computer system hardware. (See hardware.)

SUBSIDIARY COMMUNICATIONS AUTHORIZATION (SCA)--A special license from the Federal Communications Comission permitting FM stations to transmit additional non-broadcast (i.e. non-public) signals by subcarrier. SCA's on radio broadcast stations may be leased for commercial background music in shopping areas, services to handicapped persons, training programs for special target groups, etc.

SUBCARRIER or SUBCHANNEL--An additional signal imposed on the station's carrier. This "subchannel" carries information--sound or data--which requires a special receiver.

TELECONFERENCING--A term for any simultaneous visual and/or sound hookups that allow individuals in two or more areas to see and talk to one another in a long-distance "conference" atmosphere. Usually accomplished through telephone and CCTV feeds carried by satellite.

TELEMETRY--Communication of information generated by measuring devices. A common application in health services is the transmission of electrocardiogram readings to a specialist in a medical center. Centralized monitoring of stream levels and water quality is another application of telemetry.

TELEPROCESSING--Data processing where the actual data manipulation is performed at a processor that is electrically connected but physically remote from where the data is entered or used. (See on-line.)

TELETEXT--A technology which allows the use of one's TV set to select and display computer-generated information. Teletext is a one-way "endless loop" transmission technique. See videotex, of which teletext is a subset.

TERMINAL--A device which can send or receive information over a communications channel. A computer terminal can enter data to a processor and can receive information on how the computer is processing the information. Other examples of terminal devices are telephones, teletypes, and some television sets that are equipped with interactive devices.

TRANSPONDER--The electronic circuits of a satellite which receive a signal from the ground, amplify it, and transmit it back to earth at a different frequency. Typically, a single transponder can carry one color TV signal or 600 2-way telephone conversations. Current communications satellites usually have either 12 or 24 transponders.

UHF (Ultra-High Frequencies)--The frequency band from 300 to 3000 Megahertz; includes TV channels 14 to 83.

UPLINK--1. An antenna that transmits signals up to a communications satellite. 2. Transmission path from an earth station to a communications satellite. (See downlink.)

VHF (Very-High Frequencies)--The frequency band from 30 to 300 Megahertz; includes TV channels 2 to 13.

VIDEODISCS--A system of recording video images on a phonograph-like disc. Video disc systems are currently being marketed for playback only. There are two different (and incompatible) systems--one using laser (light sensitive) technology, and the other using a capacitator (needle).

VIDEOTEX-Generic term for electronic text services consisting of computer-stored information which is selected by the user and displayed on a TV set. May be one-way (teletext) or interactive. Interactive videotex normally uses telephone lines or two-way cable to allow user to access information from a centralized data base.

WORD PROCESSING--The application of computer technology to automate office functions. Among the capabilities of a word processing system are electronic storage and retrieval of documents; electronic text correction and editing; and, by being linked to a telecommunications distribution system, electronic mail and text transmission. (See facsimile, electronic mail.)

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